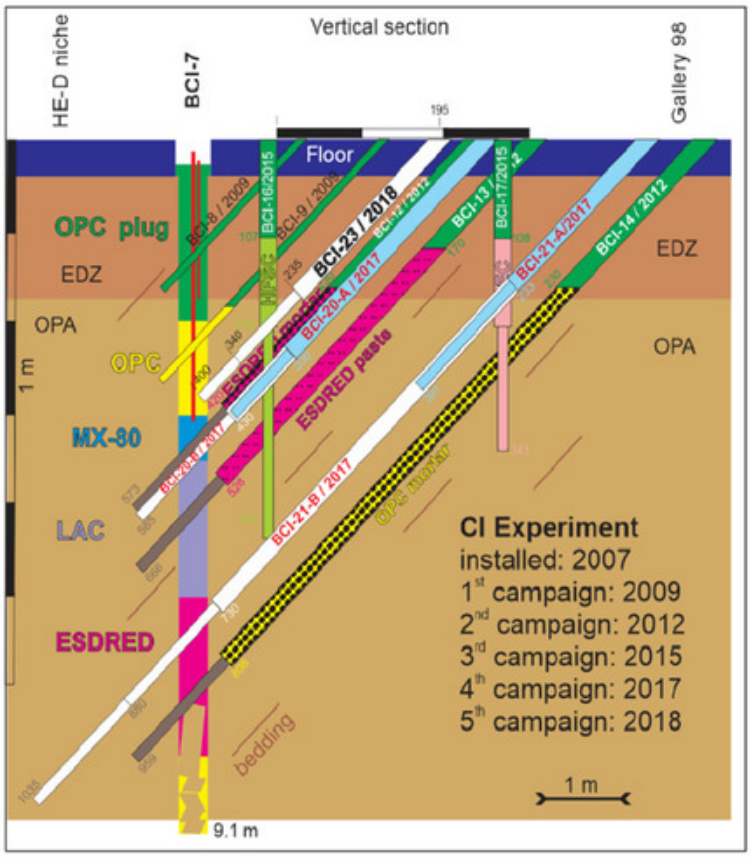
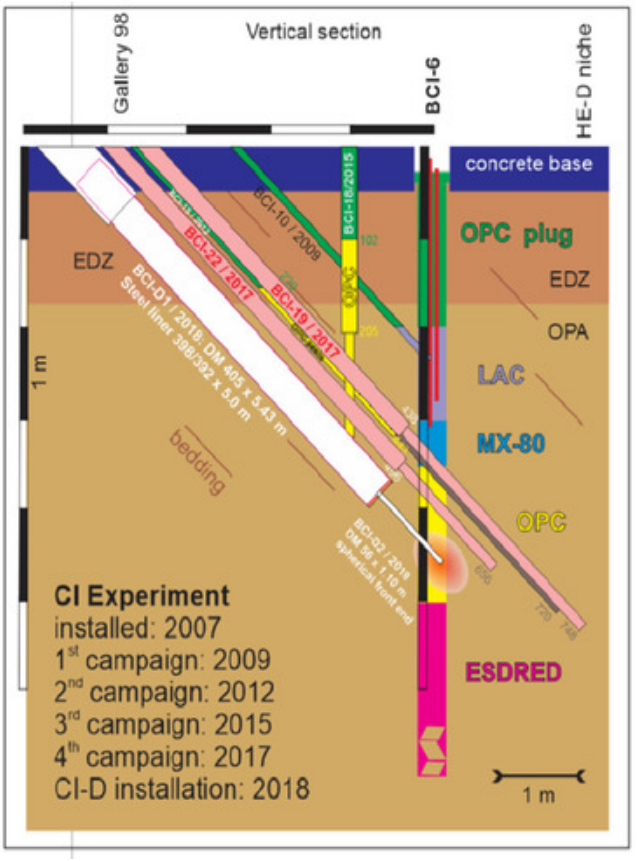
# Mont Terri Project
# Underground Rock Laboratory

## Report period: October 9–15, 2023

Assembled and edited by swisstopo, St-Ursanne




**Spotlight of the week:** The CI experiment is a long-term experiment for studying the impact of cement material on the integrity of the Opalinus Clay or bentonite. Interfaces between cement and clay materials have an initial strong (geo-)chemical gradient. The diffusion dominated interaction between these materials may result in mineral dissolution in combination with secondary mineral reprecipitation at or near interfaces. The goal of this experiment is to quantify the porosity reductions and alteration extents of chemical interactions under in-situ conditions. To this aim, modelling predictions are compared with analysed samples, which have been drilled out from the experiment at different time steps.

## CD-A (Influence of Humidity on Cyclic and Long-Term Deformations) experiment

- On Thursday, October 12, L. Borgeaud and J. Windisch (swisstopo) measured the lengths and the apertures of cracks in both twin niches to understand the cyclic deformation and possible deterioration of gallery walls (**Figure 1**).

## CI-D (Diffusion Across 10-Year-Old Concrete/Claystone Interface) experiment

- From Monday to Thursday, October 9–12, the approach borehole BCI-D3 was completed with a diameter of 350 mm to a depth of 4.6 m, grinding also a flat base for further work. Difficulties related to interference with back-fill from older sampling boreholes that made it difficult to recover the heavy cores (45 deg down-dip) were encountered. Work was carried out from Monday to Thursday by A. Eul and S. Braunschweig from Eul GmbH, and U. Mäder from Rock-Water Consulting.

## CL (CO2LPIE-CO2 Long-Term Pulse Injection) experiment

- On Wednesday, October 11, T. Theurillat, J. Windisch and A. Grignaschi (swisstopo) tested the hydraulic packer in a PVC cylinder injecting tap water up to 26 bar. In the afternoon, they measured the pressure loss and calculated the volume of water needed to fill the packer completely. The day after J. Windisch, A. Grignaschi and L. Borgeaud (swisstopo) tested again the hydraulic packer in a steel cylinder injecting tap water up to 30 bar. (**Figure 2**).

## DR-C (Diffusion in a Thermal Gradient) experiment

- On Tuesday, October 10, Y. Lettry (solexperts) was on site for checking the circuits in both cabinets of BDR-C1 and BDR-C2 boreholes. The experiment is still in the equilibration phase and the injection of the tracer cocktail is planned for early next year.

## FE-G (Monitoring the Gas Composition within the FE Experiment) experiment

- On Monday, October 9, Y. Tomonaga (Entracers) took gas samples and performed some maintenance on the spectrometer and gas sampling system.

## HE-E (In-Situ Heater Test in VE-Micro-Tunnel) experiment

- From Monday to Thursday, October 9–12, the stabilization of the Opalinus Clay / granular bentonite interface was completed at BHE-E3, by drilling 2x3 small boreholes, and embedding fiberglass tubes with resin. A steel guide was introduced for overcoring next week. Work was carried out from Monday to Thursday by A. Eul and S. Braunschweig from Eul GmbH, M. Treuthardt and F. Kober from Nagra, and U. Mäder from Rock-Water Consulting.

## SW-A (Large-Scale Sandwich Seal in Opalinus Clay) experiment

- On Wednesday, October 11, D. Jaeggi (swisstopo) installed the pressure transducer at the wellhead of the feeding borehole for shaft BSW-A2 and started pressurizing the hydration with the low pressure tank. Then T. Theurillat pressurized the LPT of BSW-A2 to a pressure of 1.6 bar relative pressure. This pressure will be maintained for at least one week and then increased by 1 bar (**Figure 3**).
- On Friday, October 13, D. Jaeggi refilled the HPT of shaft BSW-A1 and controlled the hydration performance of shaft BSW-A2.

## Visits

| Day | Date | Group Name | Group Size | Visitors Guide |
|---|---|---|---|---|
| Tue | 10.10.2023 | **Technical Study Mission On Intermediate Storage Of Spent Nuclear Fuel (Japan)** | 5 | C. Nussbaum (swisstopo) |
| Fri | 13.10.2023 | **HPC AG, Fachbereich Grundwasser** | 9 | D. Jaeggi (swisstopo) |

# Figures

**Figure 1: CD-A:** L. Borgeaud (swisstopo) measuring the crack apertures along the open niche (S. Schefer, swisstopo).

**Figure 2: CL:** J. Windisch and T. Theurillat (swisstopo) injecting tap water in the hydraulic packer contained in the PVC cylinder (A. Grignaschi, swisstopo).

**Figure 3: SW-A:** D. Jaeggi (swisstopo) installing the pressure transducer (A. Grignaschi, swisstopo).